FIG. 1

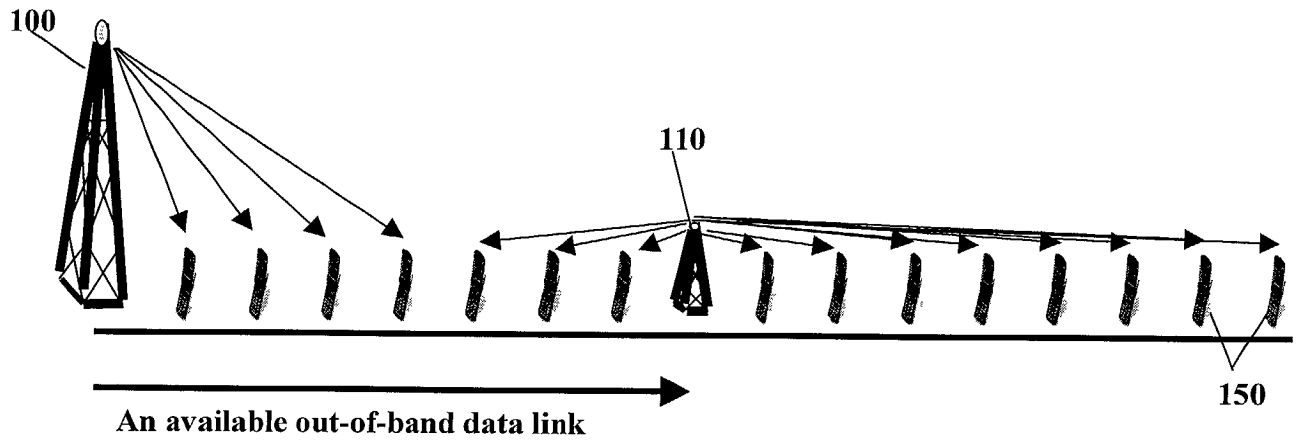

100
110
150
An available out-of-band data link

FIG. 2

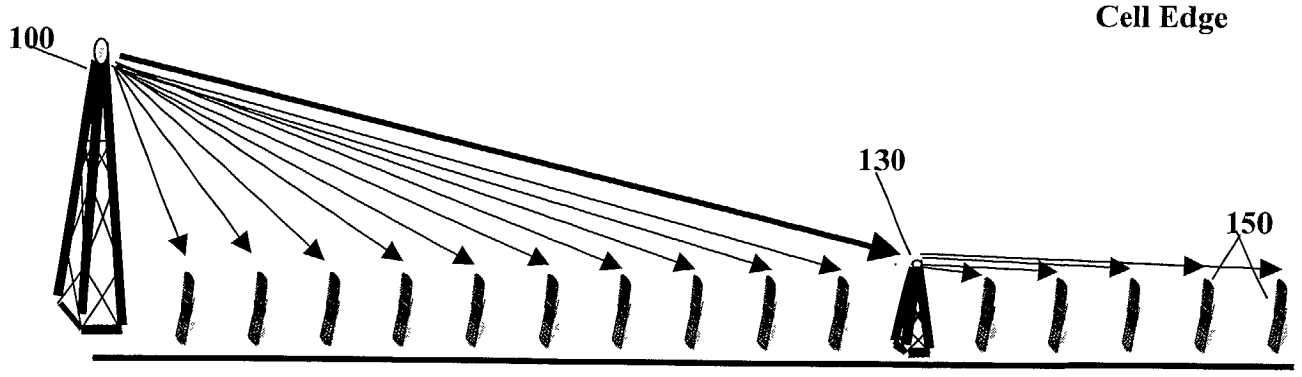

Cell Edge
100
130
150

FIG. 3

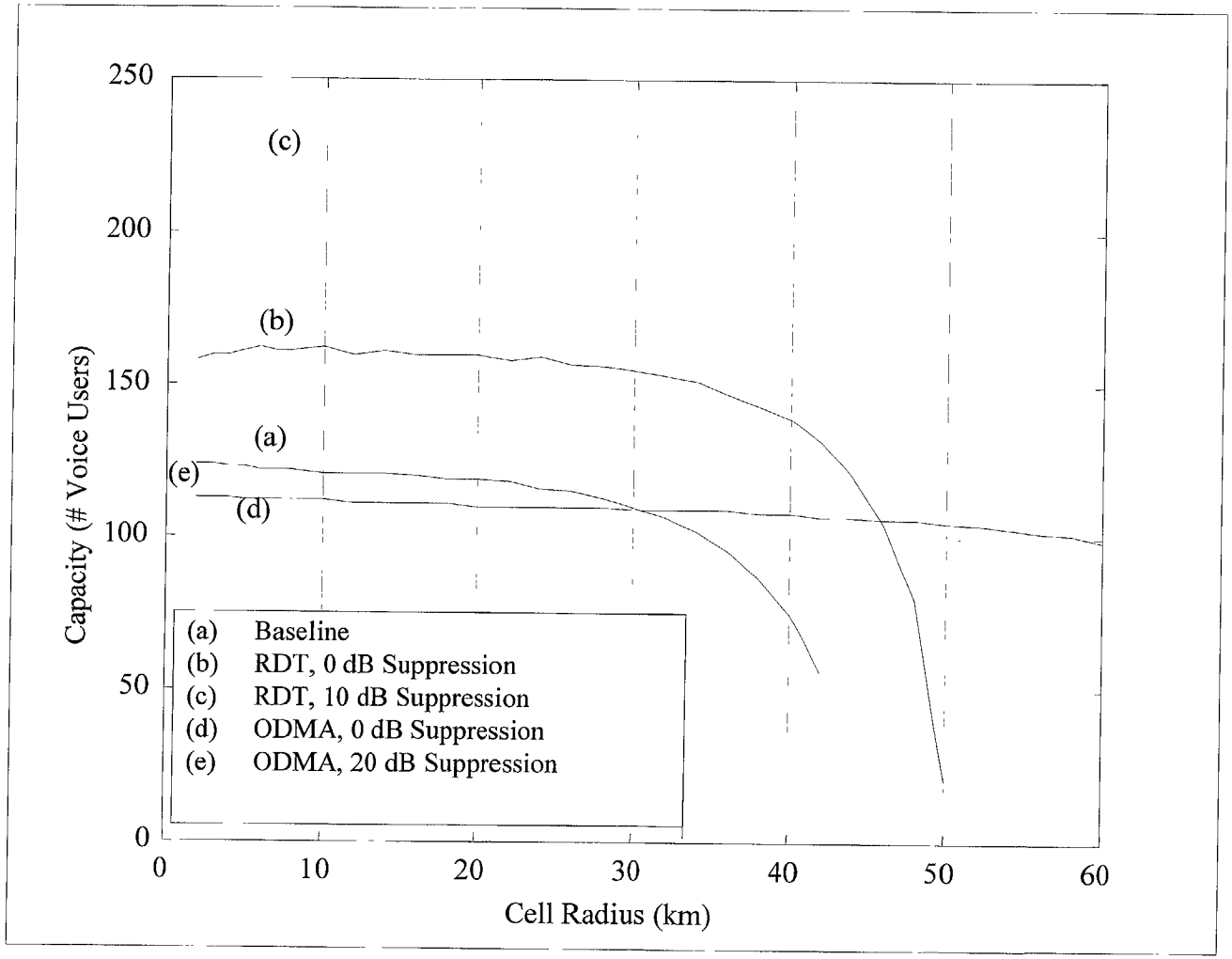

250
200
150
100
50
0
0
10
20
30
40
50
60
Capacity (# Voice Users)
Cell Radius (km)
(a)
(b)
(c)
(d)
(e)
(a) Baseline
(b) RDT, 0 dB Suppression
(c) RDT, 10 dB Suppression
(d) ODMA, 0 dB Suppression
(e) ODMA, 20 dB Suppression

FIG. 4

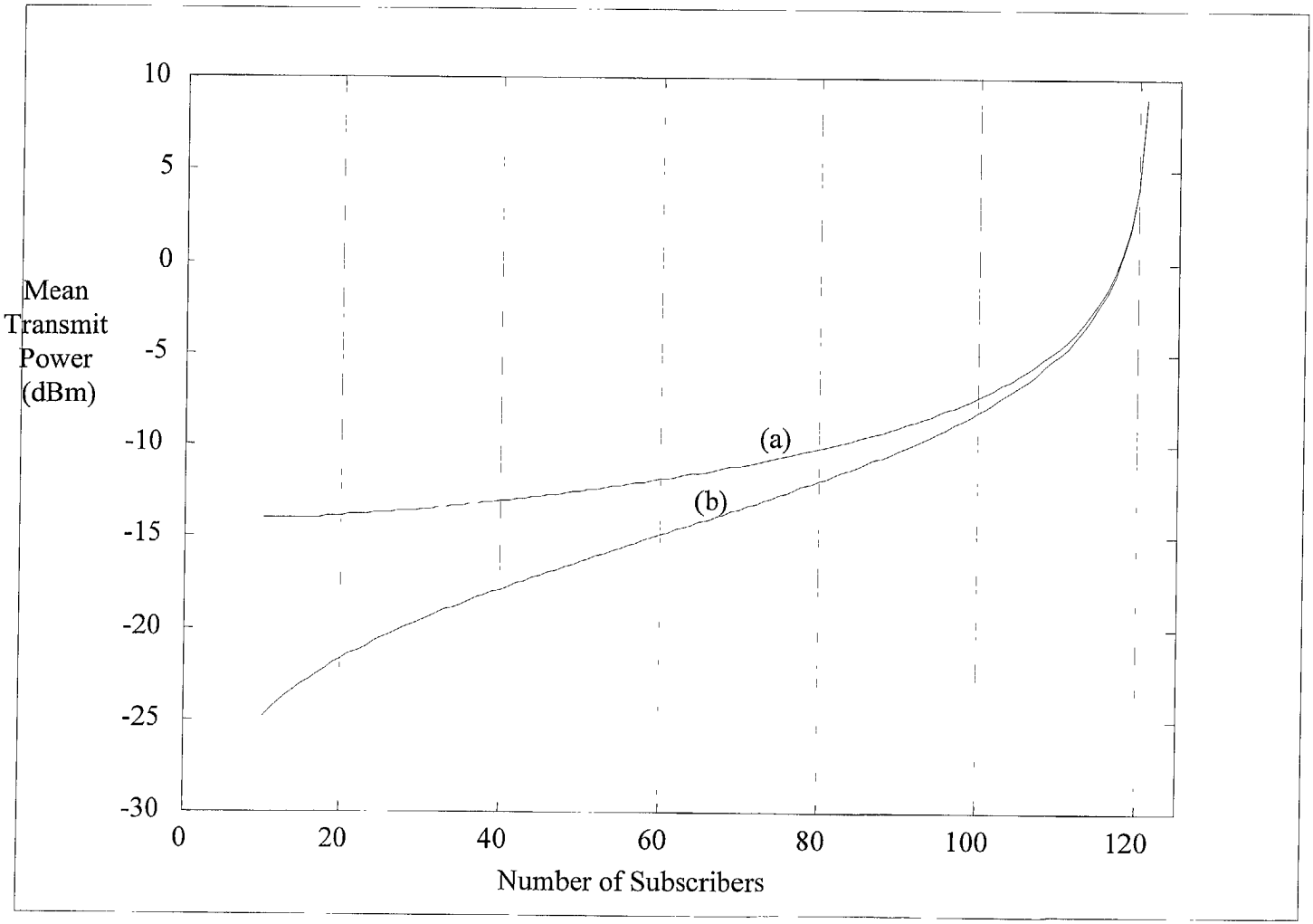

Mean
Transmit
Power
(dBm)
10
5
0
-5
-10
-15
-20
-25
-30
0
20
40
60
80
100
120
Number of Subscribers
(a)
(b)

FIG. 5

Subscriber Assignment Pattern
for a typical cell simulation

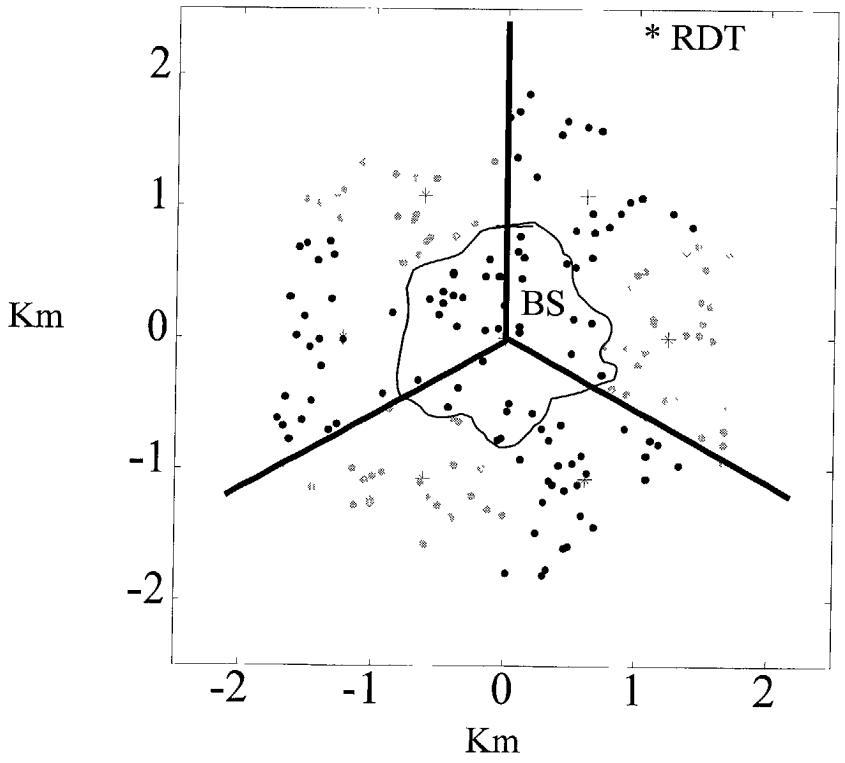


FIG. 6

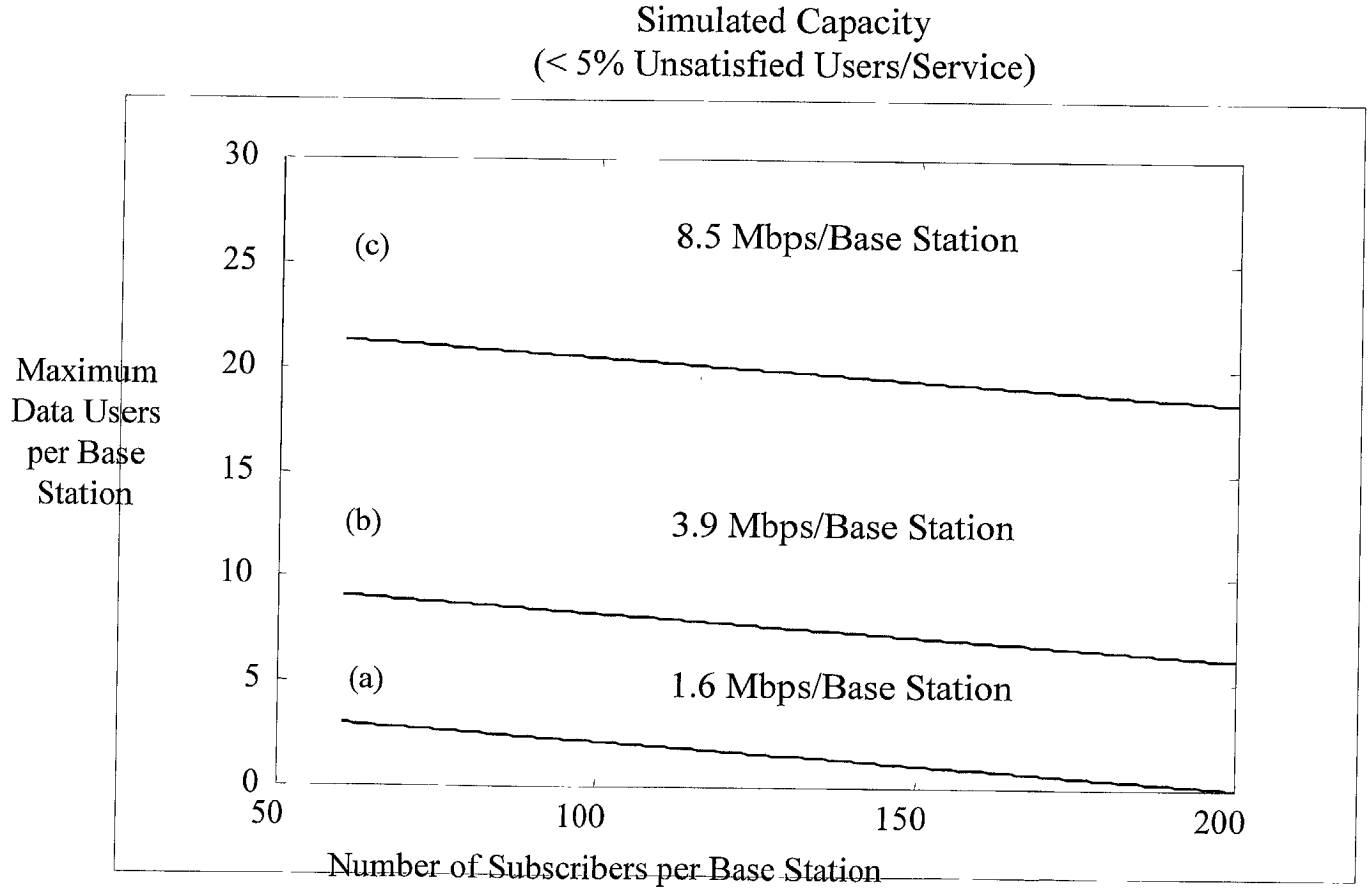

Simulated Capacity
(< 5% Unsatisfied Users/Service)
Maximum Data Users per Base Station
30
25
20
15
10
5
0
(c)
8.5 Mbps/Base Station
(b)
3.9 Mbps/Base Station
(a)
1.6 Mbps/Base Station
50
100
150
200
Number of Subscribers per Base Station

FIG. 7

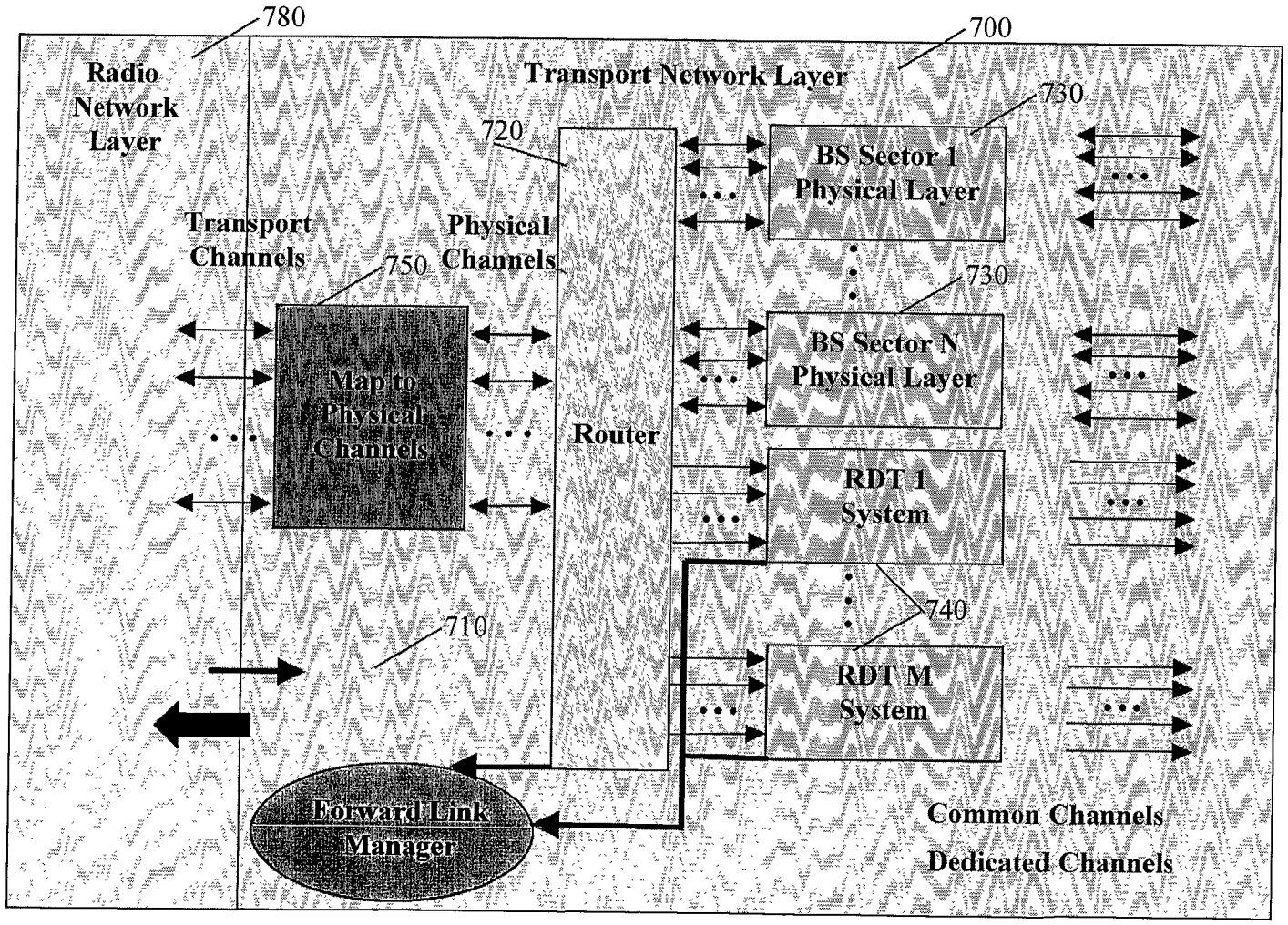

780
Radio Network Layer
700
Transport Network Layer
720
730
BS Sector 1 Physical Layer
Transport Channels
Physical Channels
750
730
BS Sector N Physical Layer
Map to Physical Channels
Router
RDT 1 System
740
710
RDT M System
Forward Link Manager
Common Channels
Dedicated Channels

FIG. 8

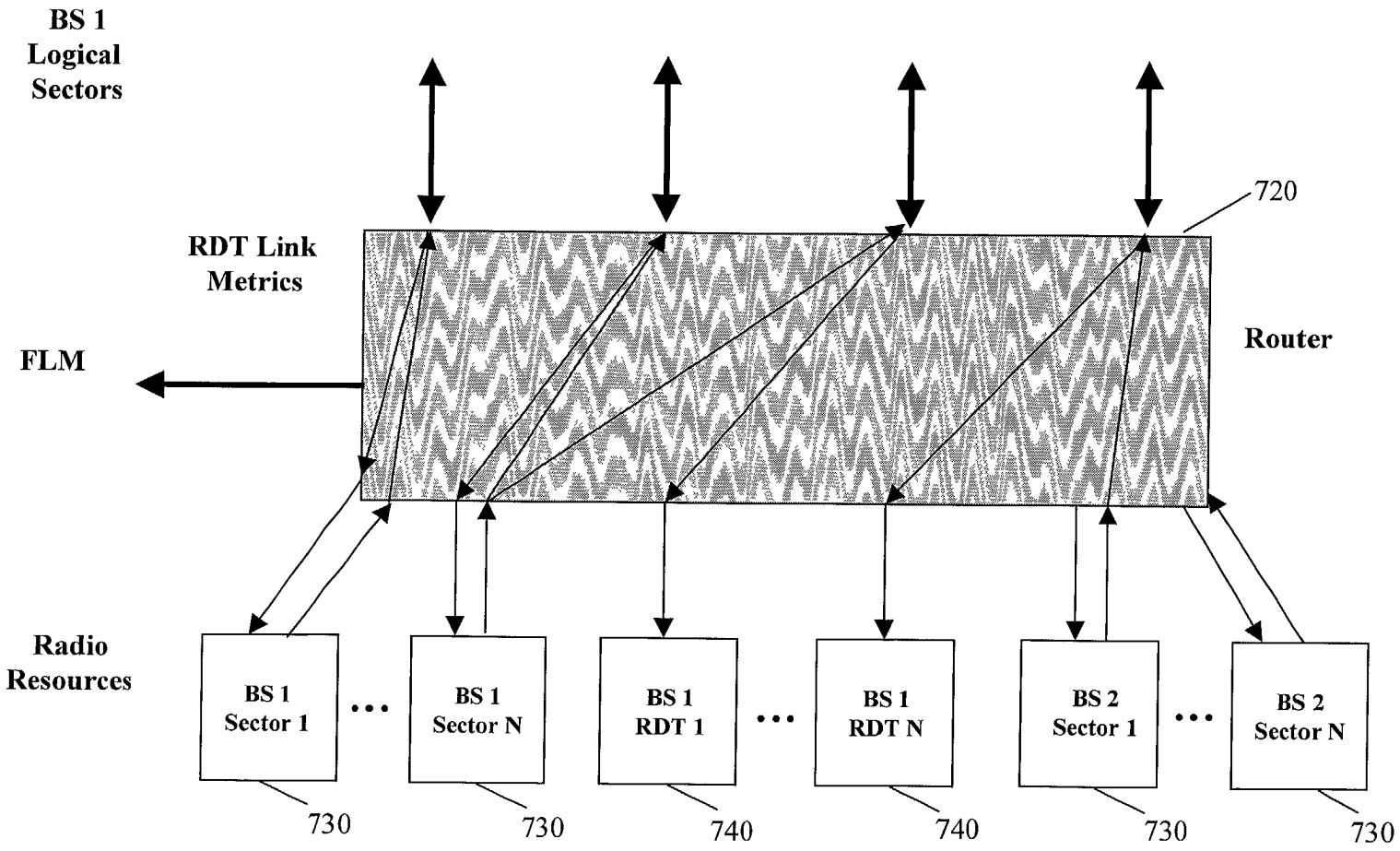

BS 1
Logical
Sectors
RDT Link
Metrics
FLM
720
Router
Radio
Resources
BS 1
Sector 1
BS 1
Sector N
BS 1
RDT 1
BS 1
RDT N
BS 2
Sector 1
BS 2
Sector N
730
730
740
740
730
730

FIG. 9

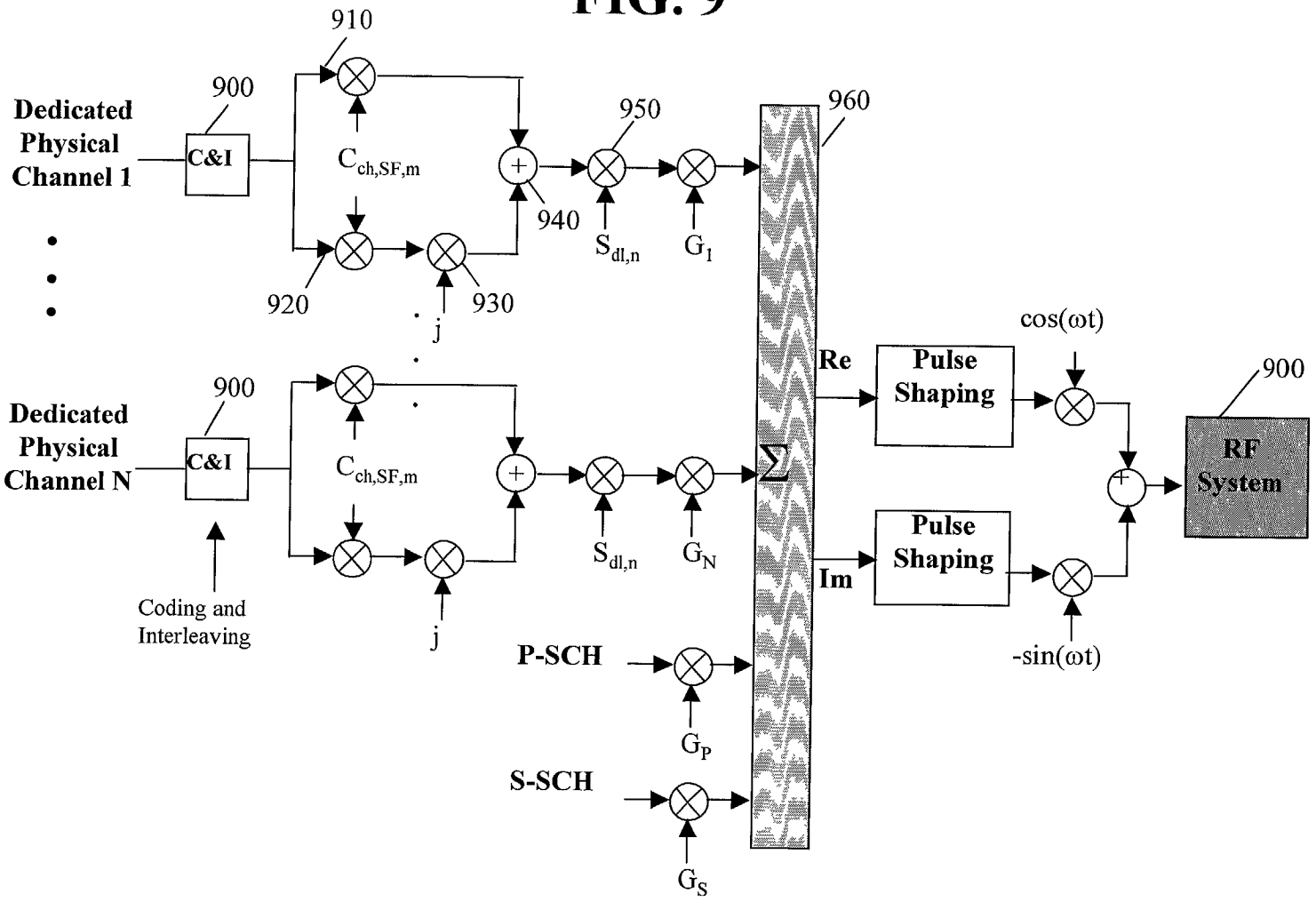

910
900
Dedicated Physical Channel 1
C&I
$C_{ch,SF,m}$
950
960
940
$S_{dl,n}$
G_I
920
930
j
900
Dedicated Physical Channel N
C&I
$C_{ch,SF,m}$
$S_{dl,n}$
G_N
Coding and Interleaving
j
Re
Pulse Shaping
cos(ωt)
900
RF System
Im
Pulse Shaping
-sin(ωt)
P-SCH
G_P
S-SCH
G_S

FIG. 10

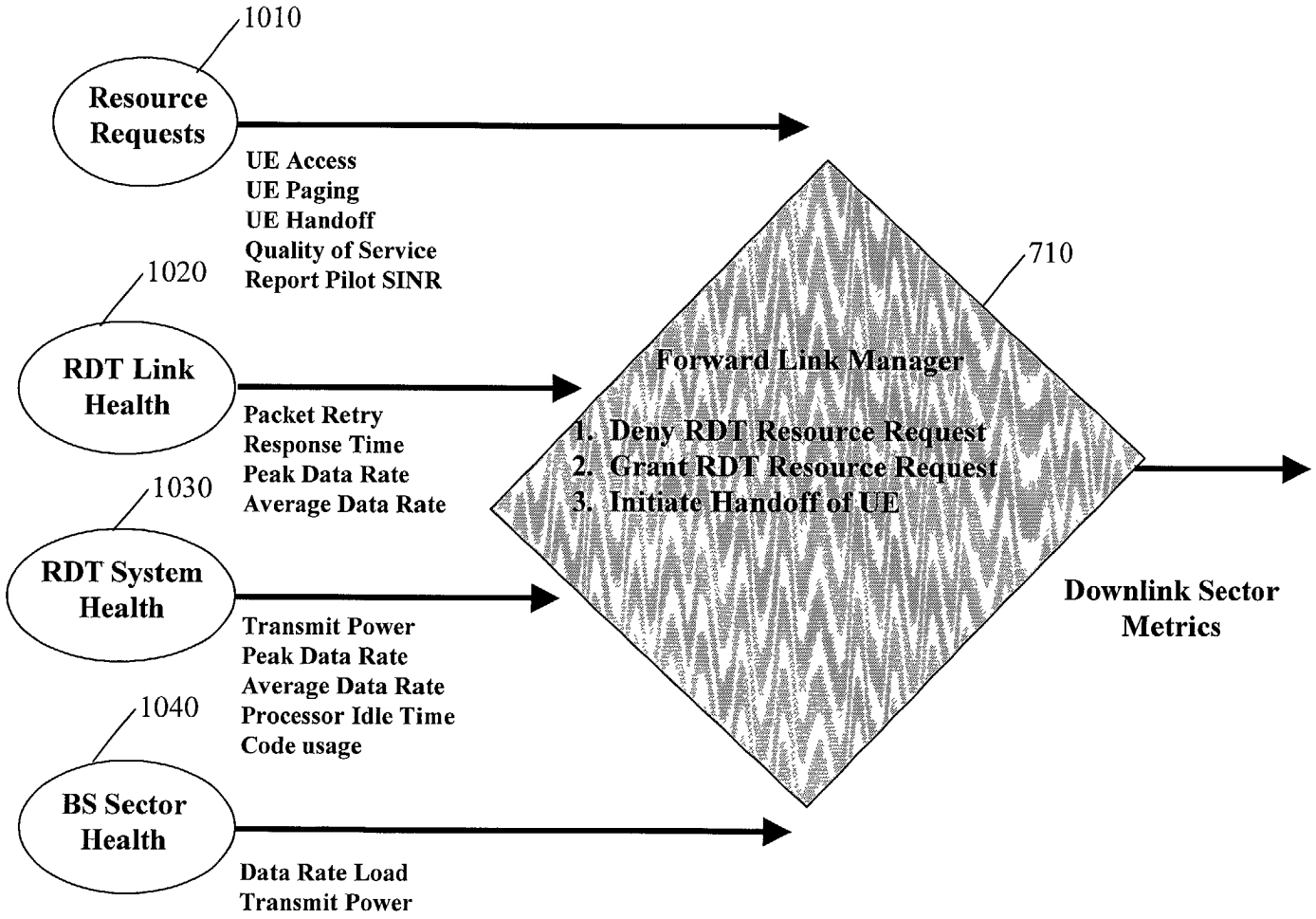

1010
Resource Requests
UE Access
UE Paging
UE Handoff
Quality of Service
Report Pilot SINR
1020
RDT Link Health
Packet Retry
Response Time
Peak Data Rate
Average Data Rate
1030
RDT System Health
Transmit Power
Peak Data Rate
Average Data Rate
Processor Idle Time
Code usage
1040
BS Sector Health
Data Rate Load
Transmit Power
710
Forward Link Manager
1. Deny RDT Resource Request
2. Grant RDT Resource Request
3. Initiate Handoff of UE
Downlink Sector Metrics

FIG. 11

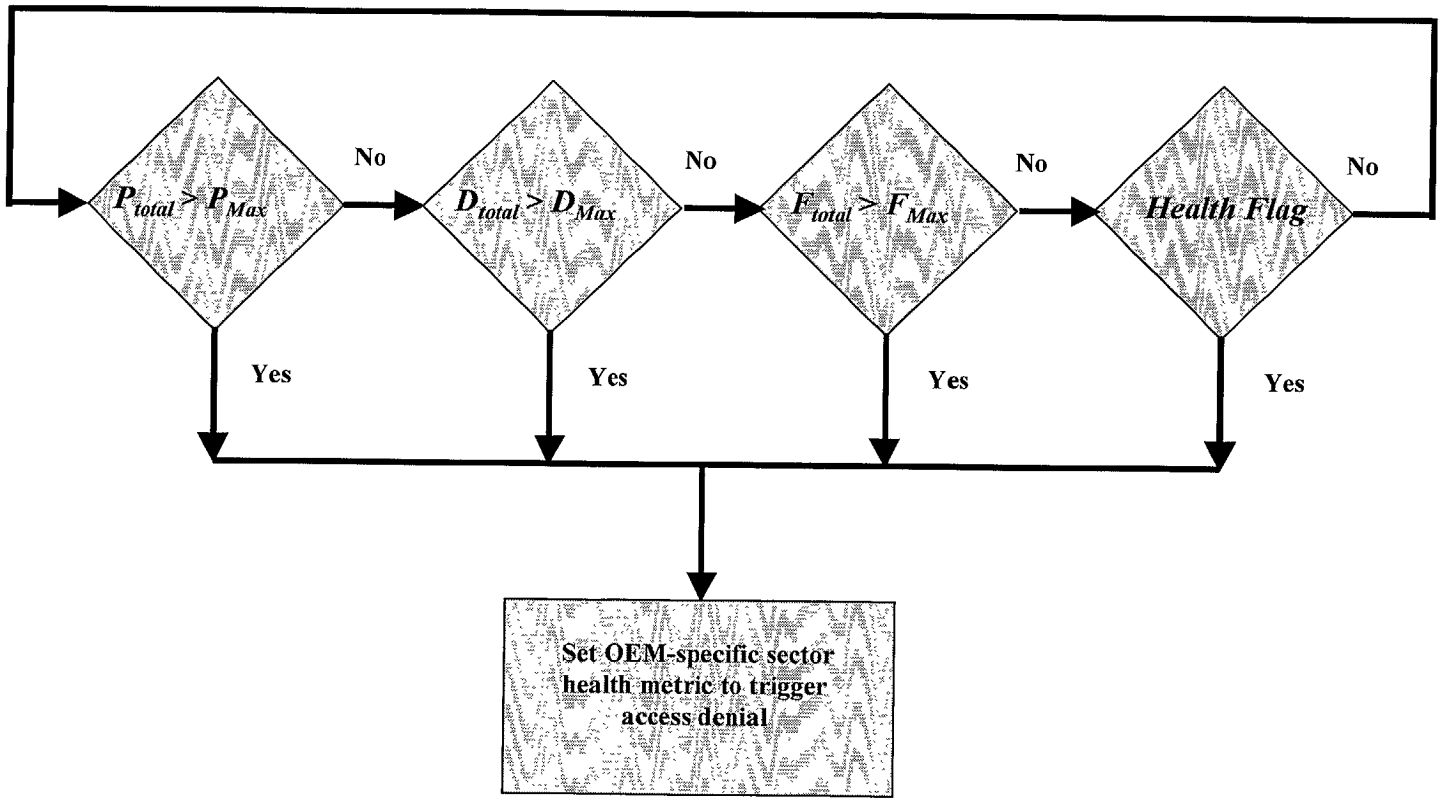

$P_{total} > P_{Max}$
No
$D_{total} > D_{Max}$
No
$F_{total} > F_{Max}$
No
Health Flag
No
Yes
Yes
Yes
Yes
Set OEM-specific sector health metric to trigger access denial

FIG. 12

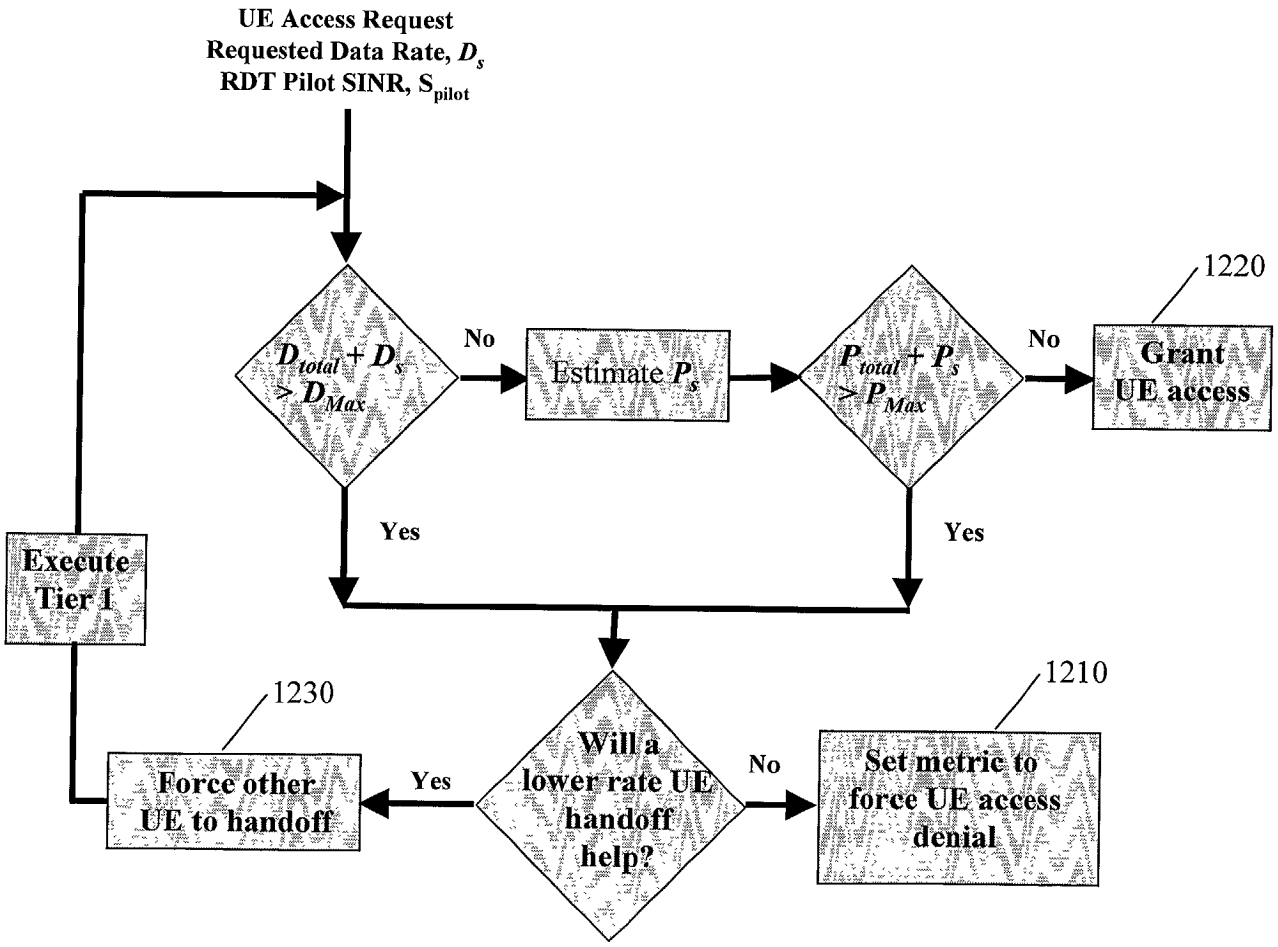

UE Access Request
Requested Data Rate, D_s
RDT Pilot SINR, S_{pilot}
$D_{total} + D_s > D_{Max}$
No
Estimate P_s
$P_{total} + P_s > P_{Max}$
No
1220
Grant UE access
Yes
Yes
Execute Tier 1
1230
Force other UE to handoff
Yes
Will a lower rate UE handoff help?
No
1210
Set metric to force UE access denial

FIG. 13

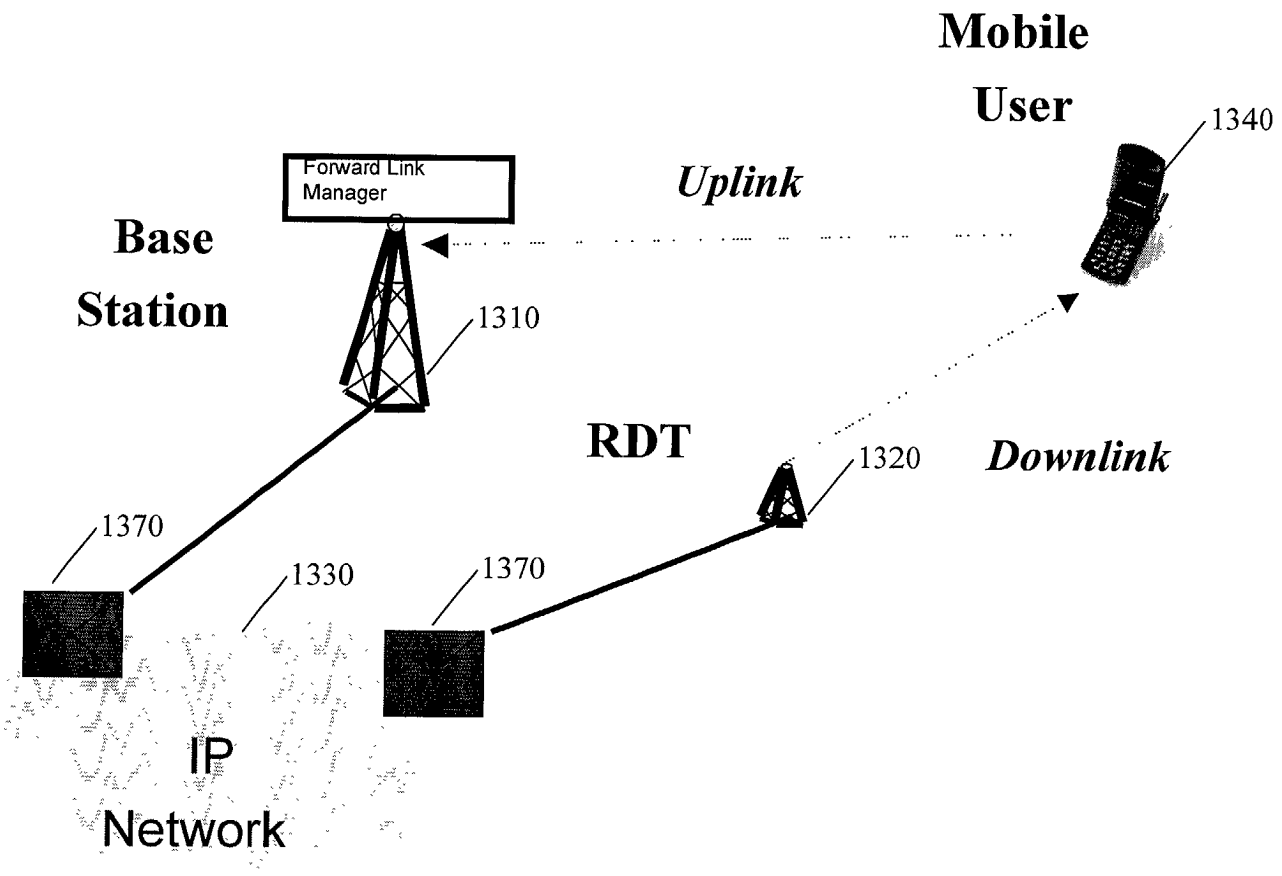

Mobile
User
1340
Forward Link
Manager
Uplink
Base
Station
1310
RDT
1320
Downlink
1370
1330
1370
IP
Network

FIG. 14

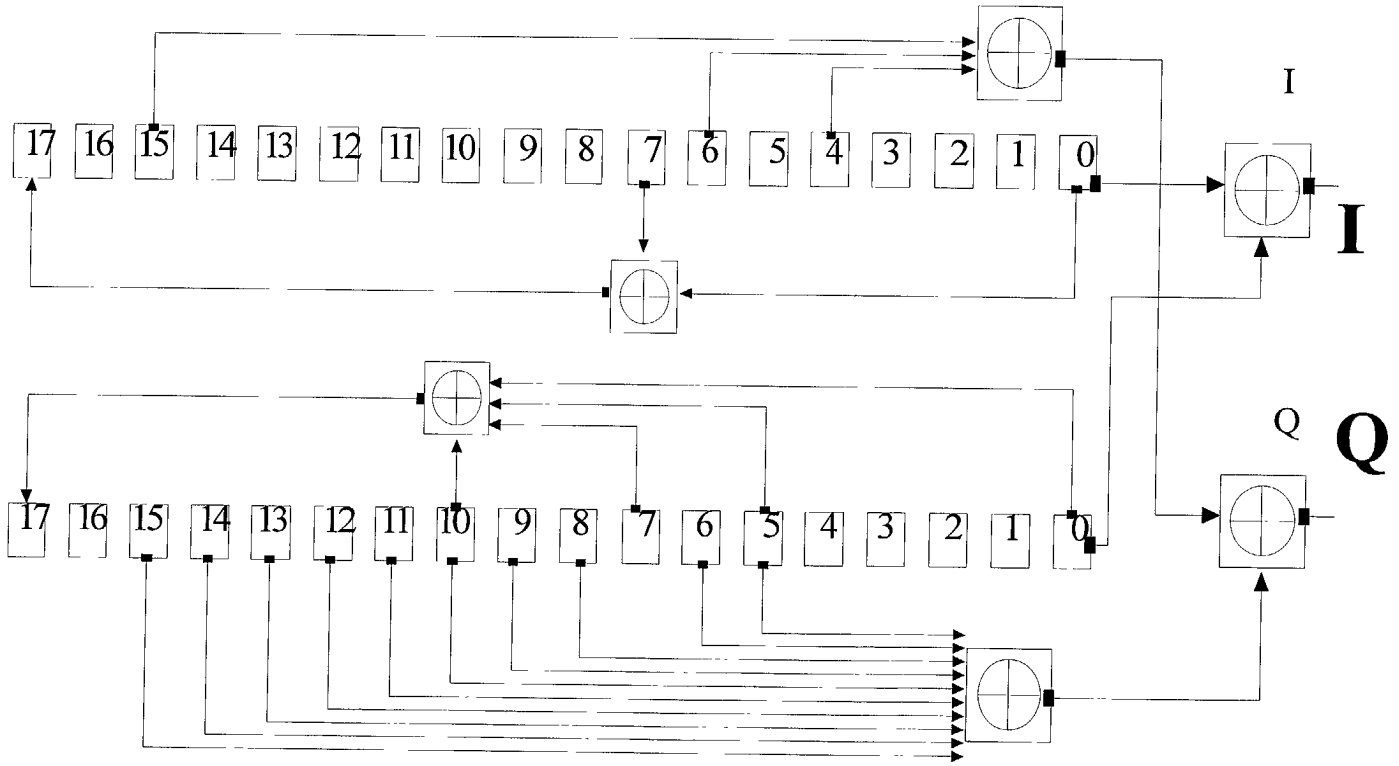
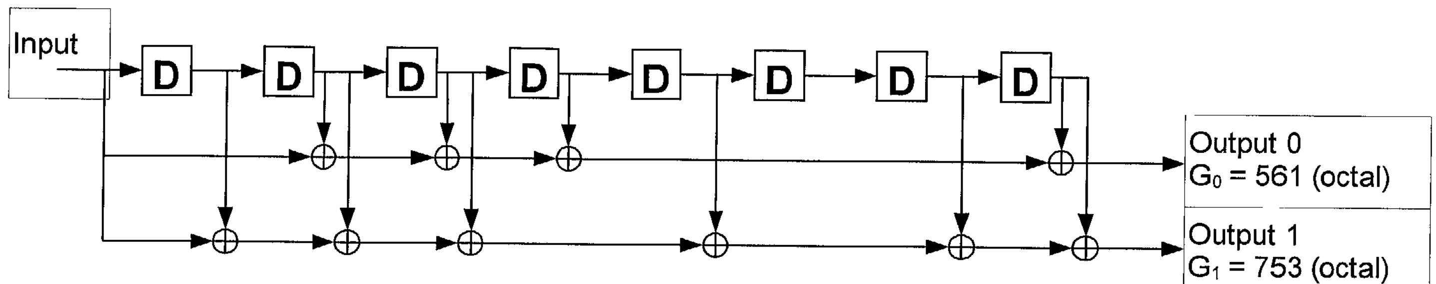
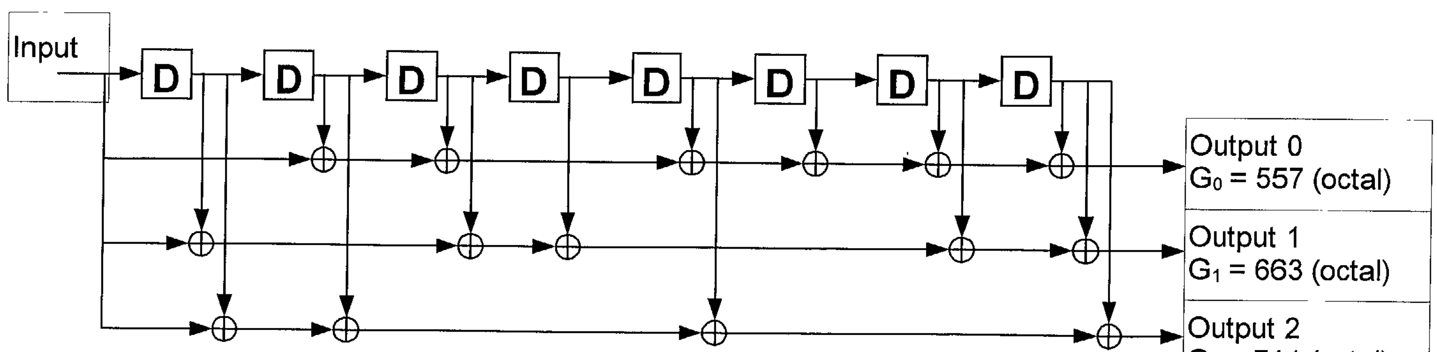


FIG. 15a



(a) Rate 1/2 convolutional coder

FIG. 15b



(b) Rate 1/3 convolutional coder

FIG. 16

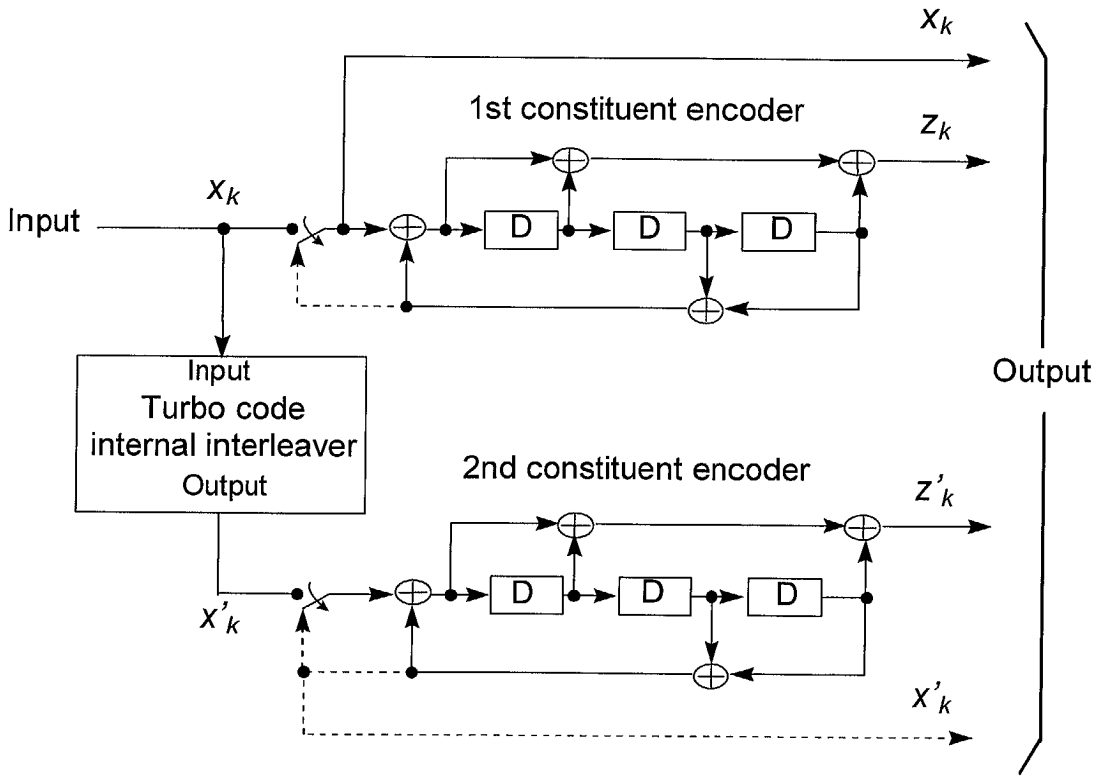

x_k
1st constituent encoder
z_k
Input
x_k
D
D
D
Input
Turbo code
internal interleaver
Output
Output
2nd constituent encoder
z'_k
x'_k
D
D
D
x'_k

FIG. 17

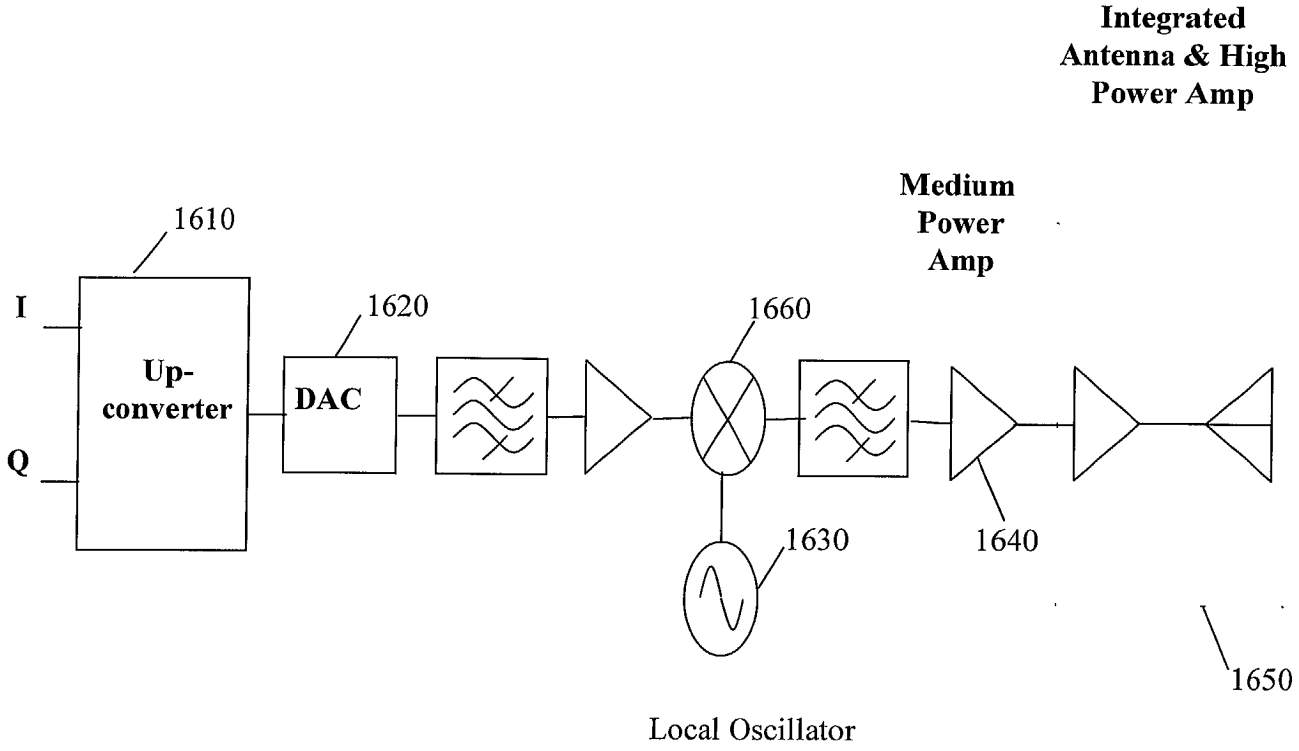

Integrated
Antenna & High
Power Amp
Medium
Power
Amp
1610
I
Q
Up-
converter
1620
DAC
1660
1630
1640
1650
Local Oscillator

FIG. 18

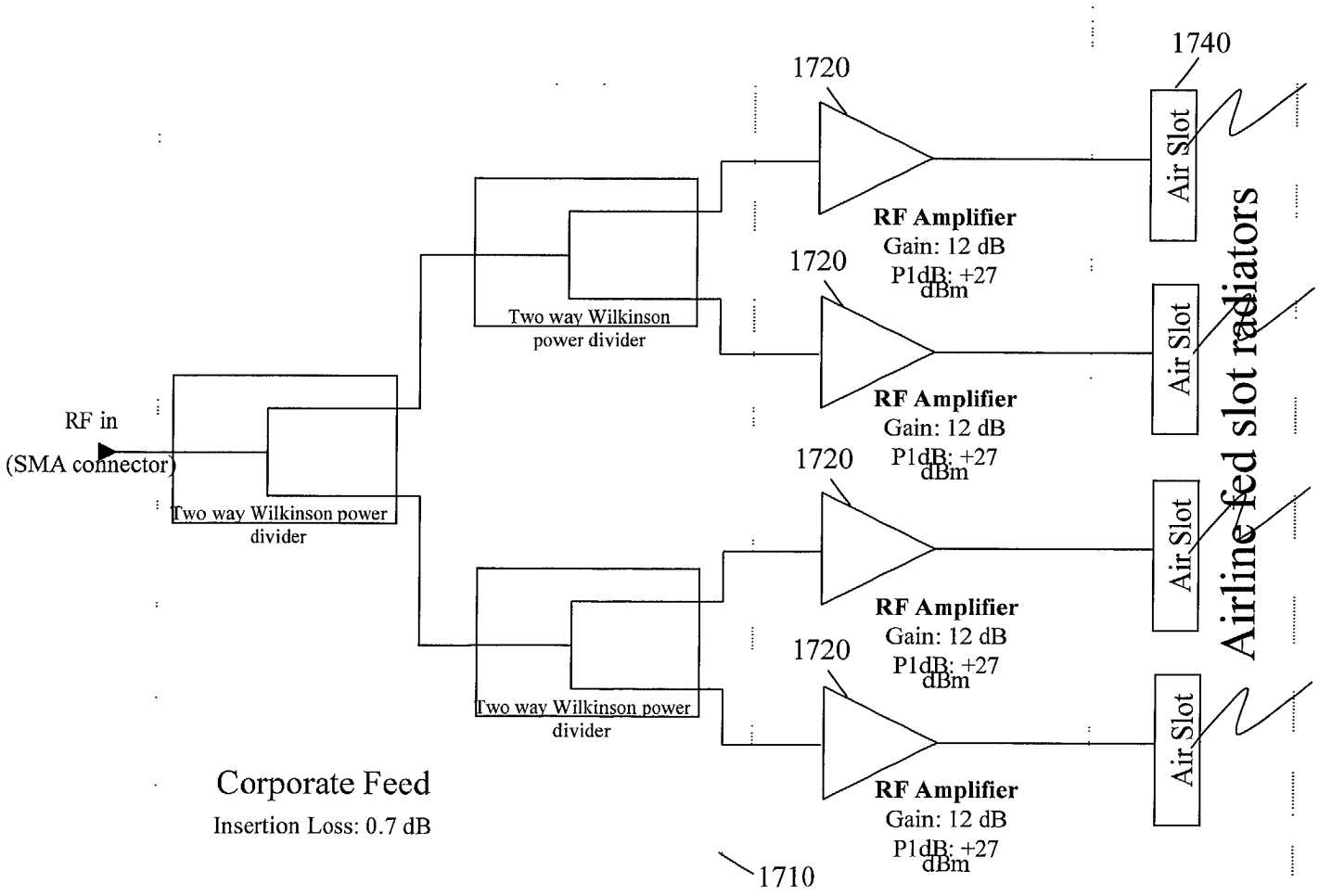

1740
1720
RF Amplifier
Gain: 12 dB
P1dB: +27 dBm
Air Slot
1720
RF Amplifier
Gain: 12 dB
P1dB: +27 dBm
Air Slot
Two way Wilkinson power divider
RF in
(SMA connector)
Two way Wilkinson power divider
1720
RF Amplifier
Gain: 12 dB
P1dB: +27 dBm
Air Slot
1720
RF Amplifier
Gain: 12 dB
P1dB: +27 dBm
Air Slot
Two way Wilkinson power divider
Airline fed slot radiators
Corporate Feed
Insertion Loss: 0.7 dB
1710

FIG. 19a

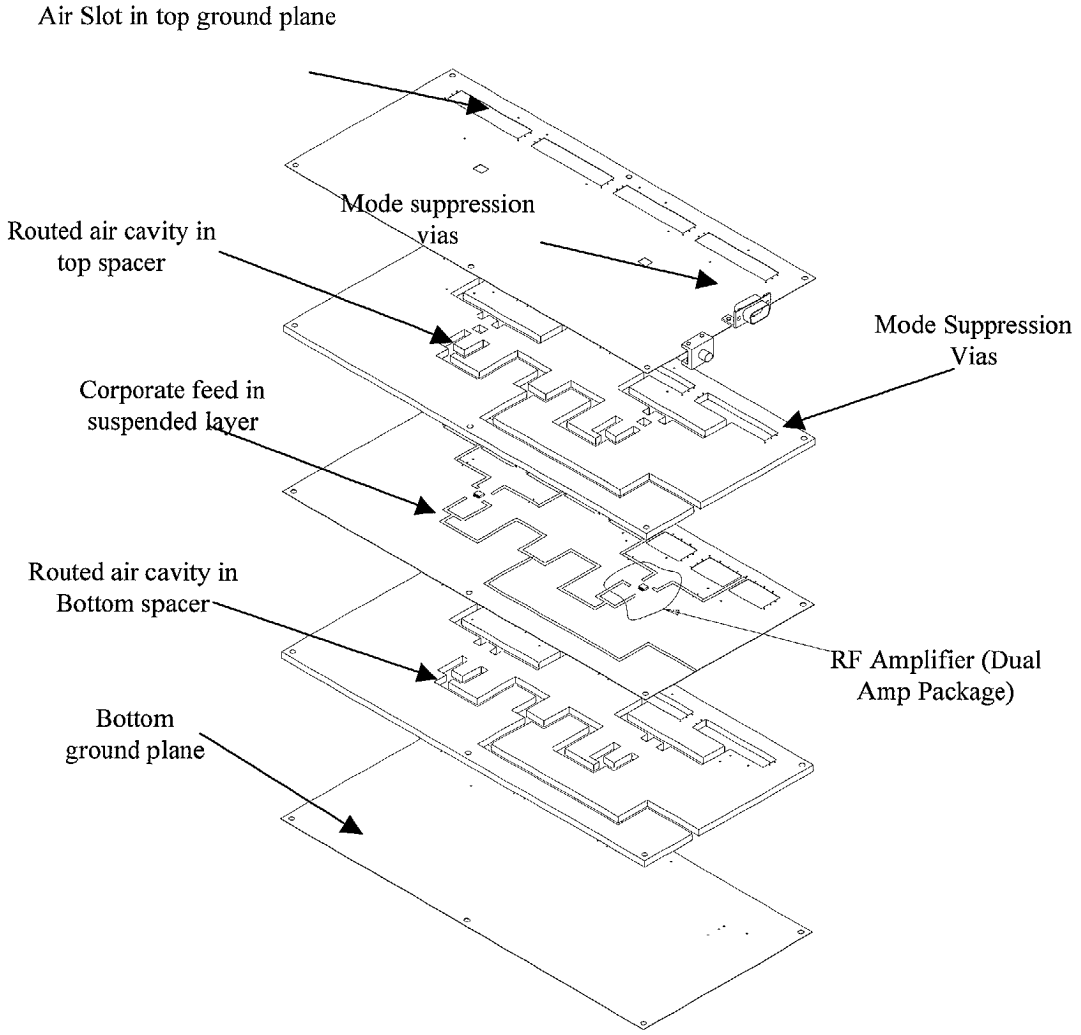

Air Slot in top ground plane
Mode suppression vias
Routed air cavity in top spacer
Mode Suppression Vias
Corporate feed in suspended layer
Routed air cavity in Bottom spacer
RF Amplifier (Dual Amp Package)
Bottom ground plane

FIG. 19b

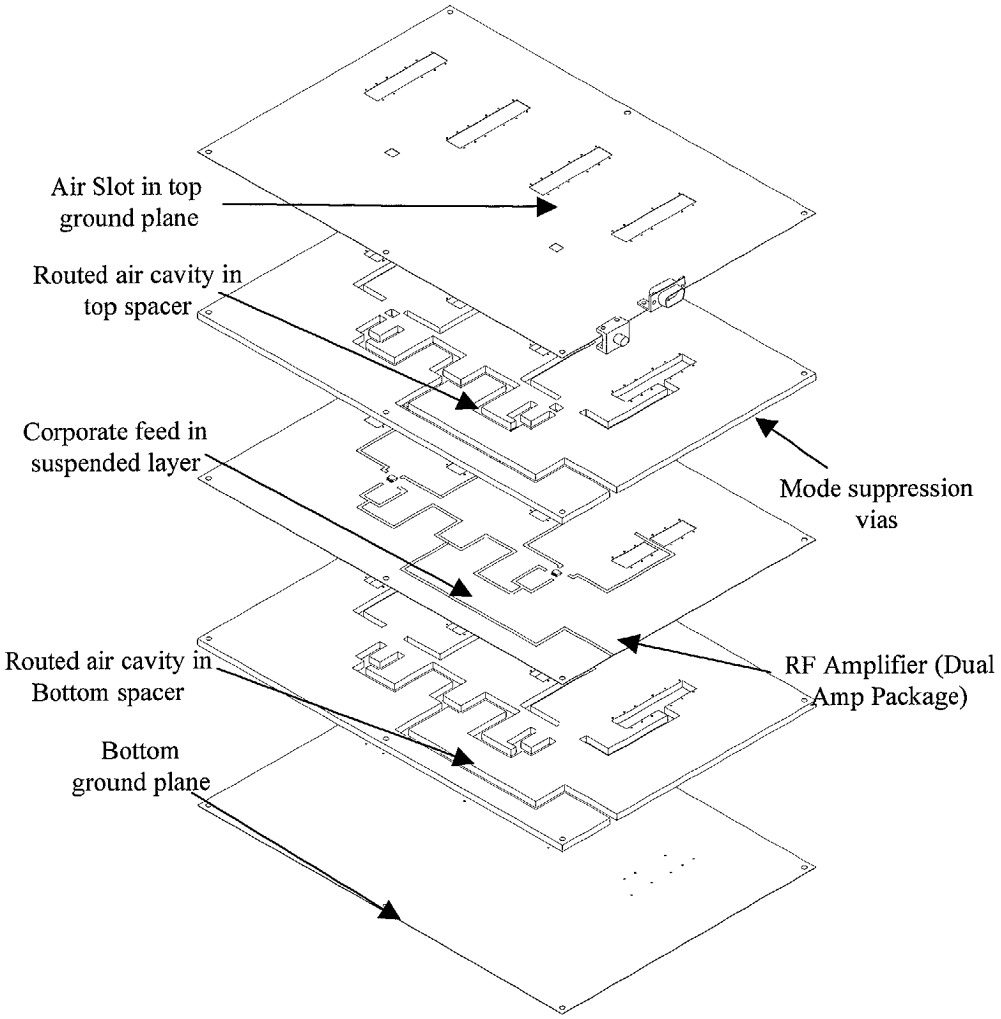

Air Slot in top ground plane
Routed air cavity in top spacer
Corporate feed in suspended layer
Mode suppression vias
Routed air cavity in Bottom spacer
RF Amplifier (Dual Amp Package)
Bottom ground plane

FIG. 20

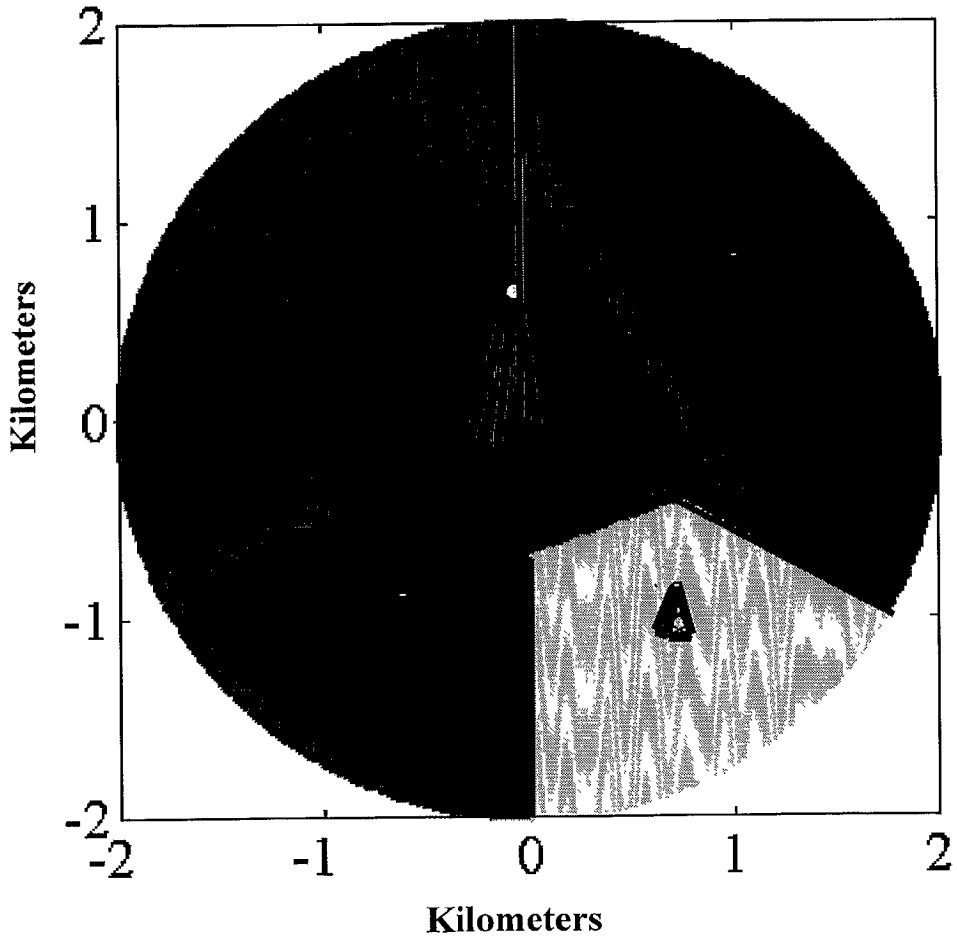


FIG. 21

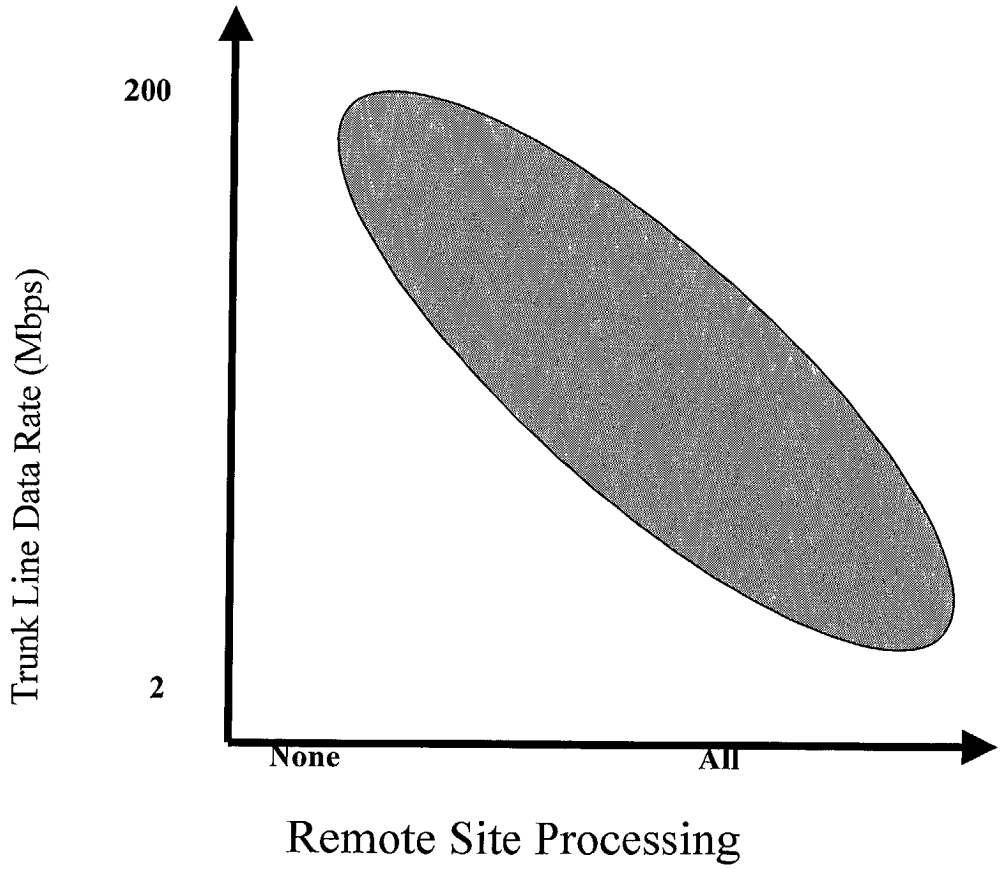

200
2
Trunk Line Data Rate (Mbps)
None
All
Remote Site Processing

FIG. 22

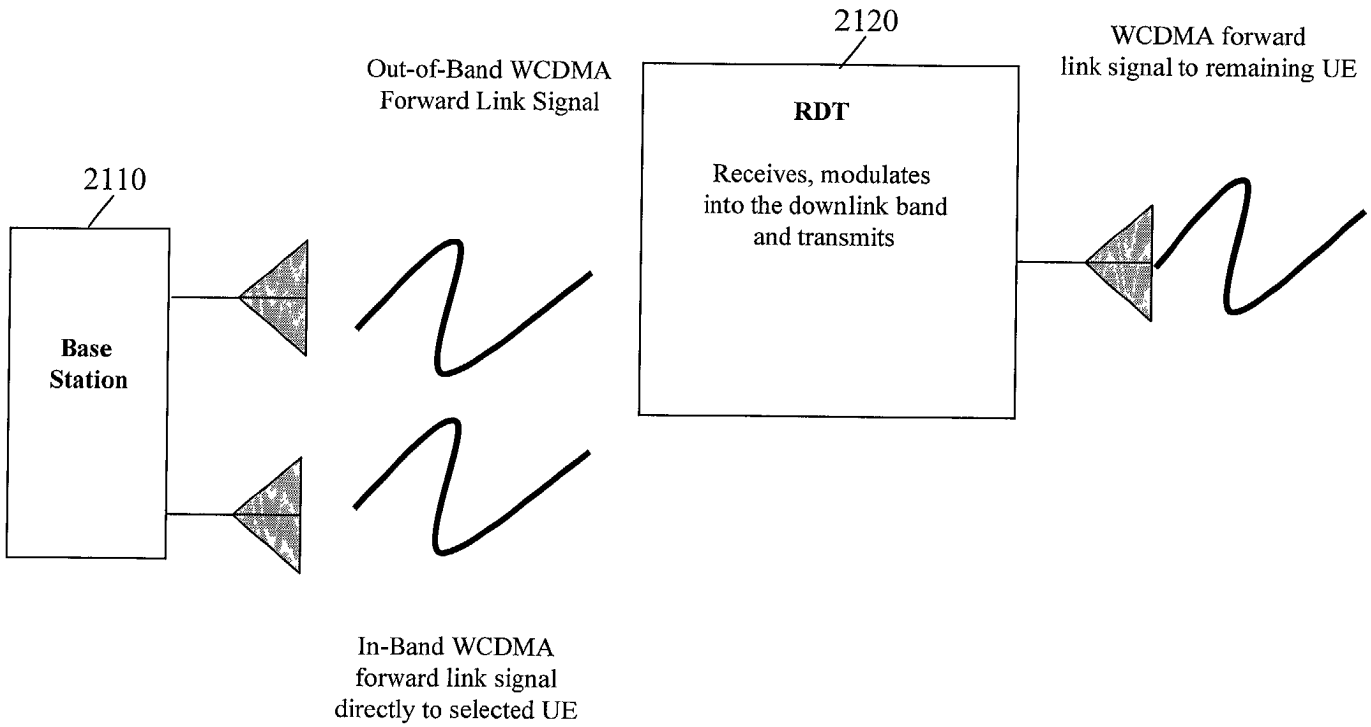

2120
WCDMA forward
link signal to remaining UE
Out-of-Band WCDMA
Forward Link Signal
RDT
Receives, modulates
into the downlink band
and transmits
2110
Base
Station
In-Band WCDMA
forward link signal
directly to selected UE

FIG. 23

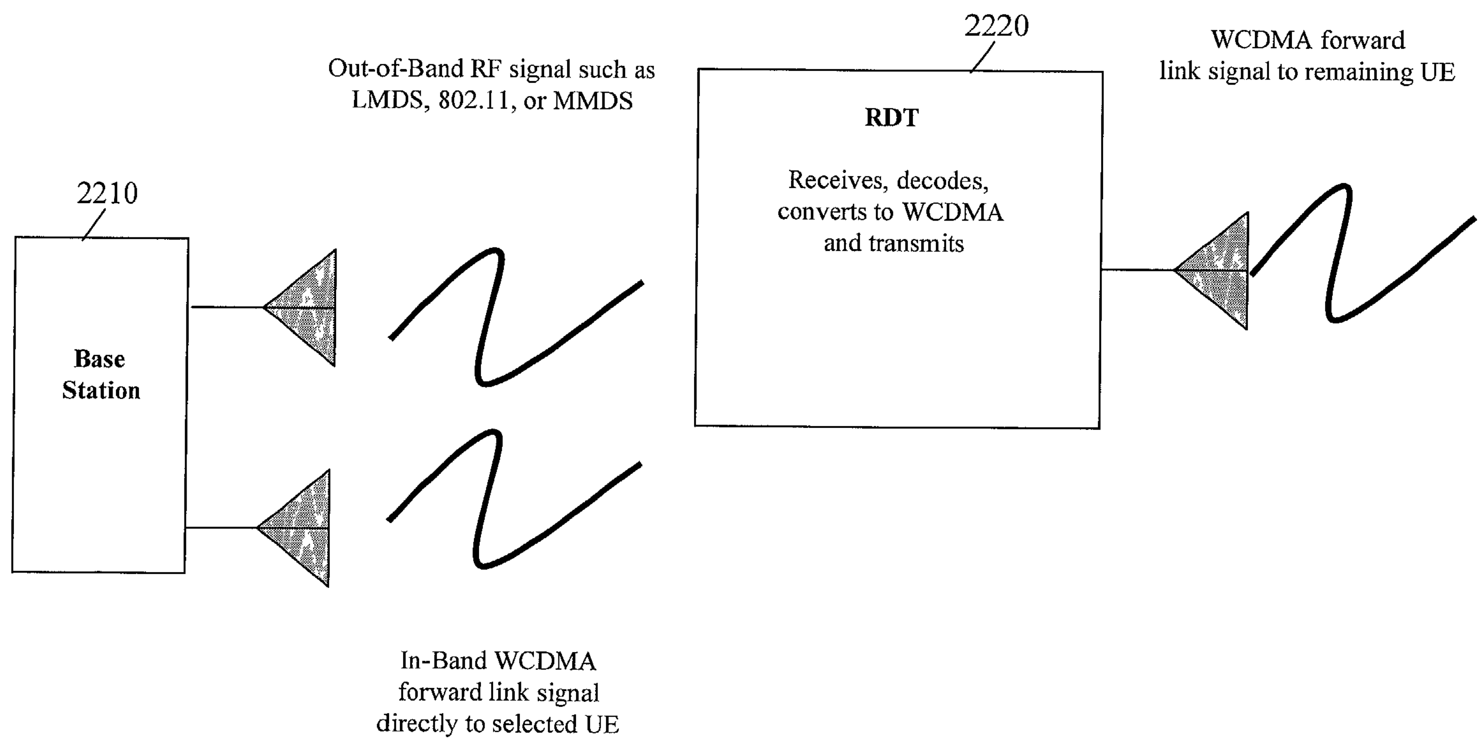

2210
Base Station
Out-of-Band RF signal such as LMDS, 802.11, or MMDS
In-Band WCDMA forward link signal directly to selected UE
2220
RDT
Receives, decodes, converts to WCDMA and transmits
WCDMA forward link signal to remaining UE

FIG. 24

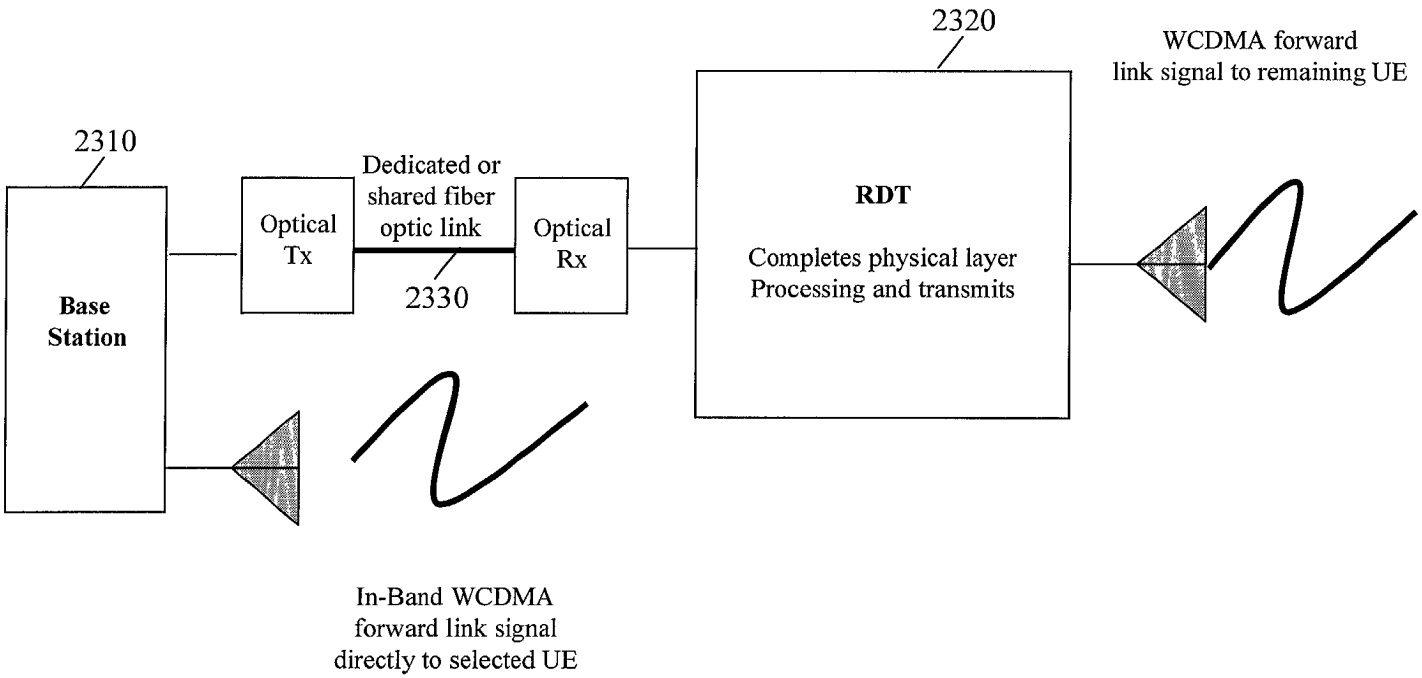
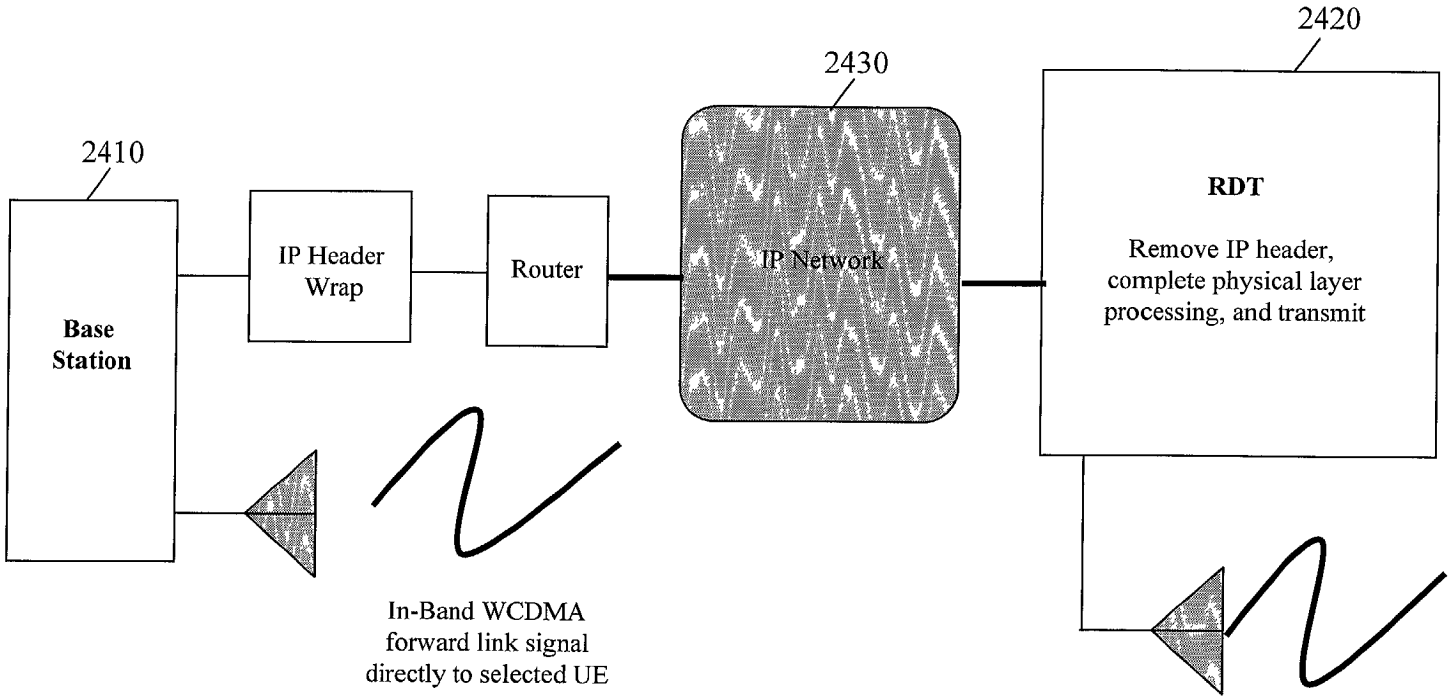

2320
WCDMA forward
link signal to remaining UE
2310
Dedicated or
shared fiber
optic link
Optical
Tx
Optical
Rx
RDT
Completes physical layer
Processing and transmits
2330
Base
Station
In-Band WCDMA
forward link signal
directly to selected UE

FIG. 25


2420
2430
2410
IP Header Wrap
Router
IP Network
RDT
Remove IP header, complete physical layer processing, and transmit
Base Station
In-Band WCDMA forward link signal directly to selected UE